REMARKS

In the Office Action of May 25, 2004, the Examiner indicated that claims 184, 190, 191, 194, 195, 196 and 200-211 would be allowable if rewritten in independent form. By the present amendment, application has represented all of the claims of the application as new claims 213-265. Applicant has enclosed a reproduction of the new claims with markings for the Examiner's convenience, showing the history of the claim language, even though the rules of the Office and Office procedure do not require this.

For example, new claim 224 is an independent claim incorporating the limitations of former claims 184 and claim 164, from which it depended. Therefore, applicant respectfully submits that new claim 224 is in allowable form. Claim 190 has been rewritten as claim 223, claim 203 as new claims 215 and 217.

Applicant submits that all claims are now in allowable form, as discussed below.

I. Introduction:

1.) To be able to assess whether an invention is obvious (meaning that it can be assembled from different machines by a person having ordinary skill in the art) it has to be considered which reasons led to the particular invention. The basis and the alignment of the machines in the cited references is very different from the presently claimed invention, even though the aim of above mentioned invention may be the same – the construction of highly efficient machines.

It depends on the basis of each invention and the basis of a person of ordinary skill in the art, whether or not he can assemble certain components into a new machine.

As the knowledge and alignment of a person having ordinary skill in the art (and also that of a specialist) is not based on the ideal condition of Faraday, these experts would not assemble the single components (should they be available), as it would not make any sense to him or her.

Only if you do basic research and question every little aspect; if you re-enact Faraday's experiments from 1821-1852, which are the basis of electro-technics; if you see what abstractions Faraday himself found in these natural laws (when he changed his mind from the real field, which crossed the conductor, to the abstract magnetic flux going through an area) and how Maxwell brought this considerations into a mathematical form, which led to the conclusion that iron seems to be indispensable in coils and the flux through a surface is being considered more

closely; then you can come to the conclusion that **really extensively highly efficient machines** can only be constructed based on the laws of Faraday, discovered earlier.

A person having ordinary skill in the art or even a specialist does not have this realization, because he sticks to the abstract form of Maxwell's equations and the views on electricity emerging from these equations, as it is customary in today's science and as it is taught on every university nowadays.

> **Iron does not amplify the field of the coil by the factor 1000-5000, like apparently proven by the theory of magnetic permeability, it only shortens the air gap. Iron is a magnetic conductor and not even a good one, when you reverse the magnetic poles, because it then causes high losses.**

A person having ordinary skill in the art would not be able to grasp the machine concept explained herein or the laws of Faraday on which these concepts are based; he would not be able to make this into the basis of his considerations and inventions and he would not be able to develop one of the machines described herein. He will only move within the limits of structures well-known to him which would exclude this extensive machine development, which is actually a completely new machine principle that the applicant has termed "**air gap principle**."

(See also: Amendment "A," April 17, 2003, page 21, last paragraph – page 25, line 5)

II. General part

1.) The comparative patent by: **Dunn (US 6,617,748)** with an earliest filing date being a provisional application filed December 22, 1998, was submitted later than this patent application which is based upon **PCT/EP99/08682** with a priority claim to DE 19852 650.4, filed November 16, 1998. Therefore, Dunn does not constitute prior art under § 102.

2.) As there have been some misunderstandings concerning the term "air gap section" and the construction of the air gap in some of the claims, this terms has been explained exactly in the claims.

Definition "uniform (even) air gap section":

A uniform air gap section has air gap boundary sections facing each other, with the same distance, between which the magnetic field runs in straight lines, coming out of one boundary surface right-angled and going into the facing boundary surface right-angled. The

stray field lines at the outer edges of the air gap section are not considered.

(See also: Amendment "A," April 17, 2003, page 16, concerning points 2 and 6)

(See also: RCE, Preliminary Amendment, February 4,2004, attached as: enclosure 1 dated April 17,2003)

Definition "non-uniform (irregular) air gap section":

A non-uniform air gap section has air gap boundary sections facing each other, with different distances, between which the magnetic field runs mainly arc-shaped; the magnetic poles are magnetized in the direction of the conductor, which is between the boundary surfaces, the field lines come out of the pole surface in the direction of the conductor and mainly re-enter the facing boundary surface in a right angle.

(see: claim 167 (former 124 (former 45)), 154 (75))

(see also: Preliminary Amendment, May 16, 2001, claim 45)

III. Comments on single points in the Office Action:

1. Concerning point 1.) Specification:

The title "dynamo-electric machine" is applied only to certain rotating electric machines, based on using electro-magnetic induction, according to Kapp Giesbert, "Dynamomaschinen für Gleich- und Wechselstrom" (Dynamo machines for direct and alternating current), Springer Verlag Berlin 1899. **(Enclosure 1)**

Thus it is proposed that the title be amended to:

"Machine of electro-magnetic induction with a bent air core coil between two magnetic bodies."

2. Concerning point 2.) Drawings:

The relative movement of the coil to the curved air gap section (not curved field) with the V-shaped coils, which are twisted relative to each other in the direction of the movement is shown in Fig. 25, 26. Another example is provided in Fig. 25, 26.

(Specification, page 24, to Fig. 25, 26, page 30, 31)

3. Concerning point 3.) Claim Objections:

The objections have been corrected.

4. Concerning point 4.) Claim Rejections:

Concerning claim 165, 189 (New claims 213, 214), 179 (New claim 234),

Aoki's invention does not have two air gap sections bordering each other at a corner edge 10 at an angle of 90°. The front conductor is not positioned in an air gap or air gap section, as it is laid down in the generic definition of the first claim 165.
As there has been a misunderstanding concerning this at some other point (Concerning Point 12), the term "air gap section" (according to the definition III., General part) was taken over into the descriptive part of the claims.

In Aoki's invention, essential characteristics of an air gap section are missing for the front conductors. In Aoki's invention, the magnet is at most magnetized radially (in the worst case the magnet is magnetized diametrically **(See also: Point 6, page 9, last paragraph))**, so that the field lines emerge into the cylindrical air gap in a right angle. The single lateral stray field lines emerge slantwise and in an uncontrolled way from the magnet and thus take unforeseeable ways, which means most of them cannot be used, even when a package/casing return path is used, as in **Aoki**'s invention. As the stray field makes up only 1-2% of the main field, the possible use of the stray field is infinitesimal. If you also have to add an elongation of the conductor, then not only the minimal gain is lost, but the additional ohmic loss will also reduce the currents and the torque.

This would also be the case with **Aoki**'s invention, if the winding would not have a different, important advantage for the front face position of the conductors, which only has an effect when everything is dimensioned accordingly. The use of the stray field is only a theoretical one here, a not-well-researched and meaningless side effect. The reason for the conductor being led across the front side is that the conductor (with the kind of winding that is being used) is positioned in a steep grade in the pole face area (air gap) **(Aoki, Fig. 2A, 2B).**

What has not been discovered here is the following: The effective, rhomb shaped pole face of the winding will be increased, which means that more conductor lies within the field of the hollow-cylindrical air gap, in a steeper position. These effects lead indirectly to a better use of the copper. This can, if the machine is dimensioned cleverly, make a smaller dimension of the whole machine possible.

It also escaped Aoki's notice when describing the front conductor that this kind of winding leads to a multiple overlapping of the conductors; with the chosen dimensioning a 10- to 16-fold overlapping. Fig. 1 in **Redfern (US 954,623)** comes close to reality concerning this. This is also the reason why these machines are not built.

(see: point 7, to claim 170, page 11, begin with Fukami's machine – to the end)

Applicant has examined the possibilities of the use of front conductors with this kind of winding for a possible further development of his invention, but Fukami does not teach or suggest the presently claimed invention.

(see: point 11, to claim 182, page 17, second paragraph)

Aoki's invention neither has two air gap sections bordering at each other at a corner edge nor is the folded region being used by positioning a uniform or non-uniform air gap section or at least by magnetic poles (magnetized in direction of the conductor).

As air gap sections in a right angle to each other with exterior poles are mentioned by **Morino (JP 61251460A),** claim 165 is supplemented by the content of claims 189 and 141 and becomes the **new claim 214.**

- Concerning claim 189: A machine with straight air gap sections positioned angular to each other, the inner boundary surfaces bordering at each other at the corner edge 10, one inner boundary surface of one air gap section made up of return path material, the other one of magnetic material (in the following "**heteropolar air gap construction**"), is new and not obvious to a person of ordinary skill in the art, nor even to an average expert. Dunn's patent establishes this.
- Concerning claim 141: Here, the conductors in the area of the corner edge are also used in an optimal way, which is new and not obvious for a person having ordinary skill in the art.

(Specification, page 18, last paragraph – page 19, first paragraph, page 9, last two paragraphs)

Concerning claim 234 (former 179): Claim 234 (former 179) still exists, as far as the new claim 214 is concerned, as claim 256 and this is not obvious for a person having ordinary skill in the art.

(see: above to Dunn (US6,617,748 D2))

Supplement to "Concerning point 14 claims 198, 209":

A linear use of the air gap placing of claim 189 and claim 141 and claim 209,179 from the other patents, supplemented by the patent of **Vallant de Guelis (US 4,924,128),** as defined by Faraday's ideal conditions, is not at all obvious to a person having ordinary skill in the art, just as with the rotating use.

Here there is also the advantage of an optimal use of the copper in a restricted space with all advantages of a nonferrous air gap winding for a highly efficient linear machine.

5. Concerning point 8, 16, (5, 6) Claim Rejections:

Concerning claim 168, 199, 208

As there is a misunderstanding concerning claim 168 (former claim 125), claim 219

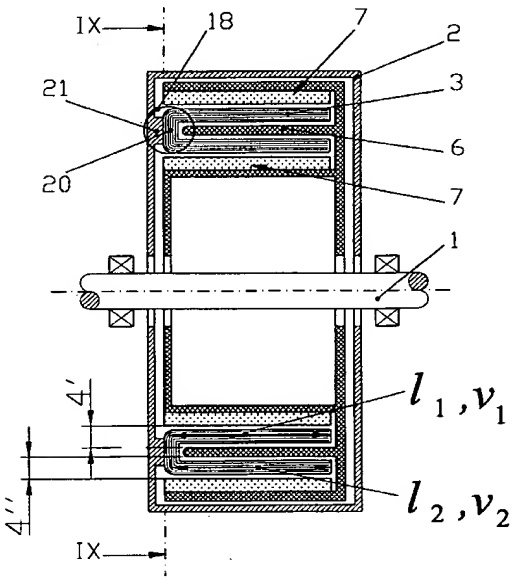


Fig.27

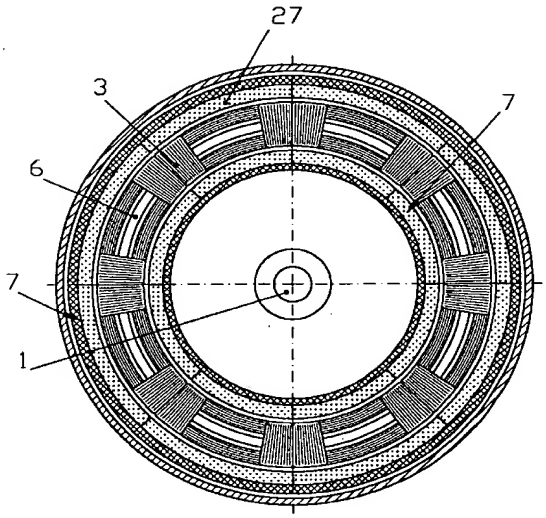


Fig.28

(168) was **To Fig. 27:** ***L* 1** has the same speed ***v* 1** over the whole air gap section

***L* 2** has another same speed ***v* 2** over the whole air gap section

supplemented by "parallel" in line 18 of the claim. In this way it becomes clear that the conductors have the same speed (relative) in the whole air gap (as shown in Fig. 27) and that they are in a parallel position to the axis or shaft.

The invention of Fischer (US 5,004,944) **is not a nonferrous air gap winding, but a winding with an iron core. An increase of efficiency on account of the iron core (flux carrying elements) is indicated here. It is true that the air gap is positioned axially here, but because of the use of iron as a core in the winding, this invention is far away from the before mentioned invention.** This even confirms that a person having ordinary skill in the art (and here even a specialist) falls back on using iron in the winding, when he wants to increase the efficiency of a cylindrical air gap winding (which was already used then). (Amendment "A," April 17, 2003, page 23, line 16-25)

This is exactly contrary to what is reached by the application of Faraday's ideal conditions. An increase of efficiency, refraining from using iron in the winding, and at the same time optimal use of the core - optimal use of the conductors with ideal speed- and field conditions. This idea requires basic research and breaking away from well-known, modern knowledge. A person having ordinary skill in the art would orient himself by the latest developments in techniques, along with the corresponding way of thinking, which means he would not hit upon the idea.

To divide an air gap into air gap sections, in section across the moving direction, is a very abstract point of view and inventive in itself – and this is not a feature of a person having ordinary skill in the art. For this reason a person having ordinary skill in the art would not base his invention on above mentioned air gap sections and their arrangement. At first sight it seems simple to see the air gap sections and move them around as required. But one has to have good reasons to move the air gap sections to places where they make sense. The person having ordinary skill in the art does not know these reasons.

He would think (if he wants to develop a highly efficient machine) that it is necessary to keep the air gap as small as possible which would forbid an air gap winding. The use of nonferrous air gap windings is, from the point of view of a person having ordinary skill in the art, only practical for a few special applications.

If an expert for air gap windings wants to construct some of these windings in a more efficient way, he would not consider Faraday's ideal conditions and the resulting aspects for the modification of the existing air gap machines. To him, air gap windings are only a compromise, as he has to do without the much-loved iron in the winding to reach certain effects.

Rabe's (US 4,763,053) **machine is no exception as his motor is based on the use of iron. Rabe's motor is far away from the present invention, as he uses iron for his winding**

(in the contact), as a flexible air gap winding would enlarge the air gap. All of Rabe's efforts concentrate on minimizing the air gap and on the efficient usage of the minimized air gap for example by using rectangular conductors, sparing the winding heads from the air gap, maximal covering of the air gap with conductors, doing without base material for the winding. Basis of this air gap usage is the efficient meander-formed wave winding, which only results in a high-poled winding and huge machine diameters, making it usable only for certain applications. The huge diameter is increased by the design shown in Fig. 11. **This winding has less axial length which gains space (volume) due to the folding but the diameter has to be increased considerably anyway, so the gain in space has to called gain in volume. The huge diameter does not count so much when a high-poled meander-formed winding is used, as this requires a huge diameter anyway.**

Rabe **does not see the huge copper utilization within the single coil, which is reached by the folding, by which the effective length of the conductor is more than doubled, whereas the ineffective length stays the same. Neither does he consider the high speed due to the huge diameter, as this is only a side effect for the chosen meander-formed winding.** Rabe does not consider Faraday's ideal conditions and so his machine cannot impart this knowledge to a person having ordinary skill in the art, as the focus is on other things. **An increase of the output in a small space is not interesting for a person having ordinary skill in the art, when this is linked to high-poled machines, an enlargement of the diameter and an extensive constructive expenditure concerning fig. 9. If it is so strenuous to use the disadvantageously large air gap (which he sees as a compromise), a person having ordinary skill in the art would rather not have such a large air gap, if it is not required (like, in this example, for a disk drive).**

(See also: Amendment "A," April 17, 2003, page 18, last paragraph – page 20, first paragraph, page 26, to claim 125)

The invention of claim 168, 208 (see Fig. 27, 28, Fig. 33-35) **is based on the basic understanding of Faraday's ideal conditions and this basis is required to think of this invention. The invented machine is nonferrous in the contact to the winding. The mostly parallel air gap sections are close to each other and both use a high girth speed. The conductors have a high copper utilization within every coil. The machine has a small axial length and a small diameter and it can use low-poled windings.**

(Specification, page 19, line 9-16 (Fig. 27, 28))

Supplement to "Concerning point 14 claim 198,210,211":

(Specification, page 21, line 1-14 (Fig. 33-35))

A linear use of the air gap placing of claim 210 and claim 211 from the other patents, supplemented by the patent of **Vallant de Guelis (US 4,924,128),** as defined by Faraday's ideal conditions, is not at all obvious to a person having ordinary skill in the art, just as with the rotating use.

The advantages of this design for a linear usage are unknown to a person having ordinary skill in the art. The advantages are similar to the advantages of a rotating usage, but instead of a small diameter you have less machine volume, which means the machine is compact.

6. Concerning point 6.9:

Concerning claims 166, 176, 177

A spherical direct current-motor is known from **Nozawa (JP 58-179,153),** but this was not developed with regard to efficiency. This also shows that, apart from the spherical design (which offers a relatively poor efficiency) no machines with better efficiency are shown here, rather a change for the worse.

A further decrease of efficiency is caused by the development into a half-spherical motor (Fig. 3), which has the most inefficient conductors in the high speed area, the winding heads. This motor is a special construction form, which only makes sense for a special application. Here, the problem of overlapping (Figs. 2, 4, 5) near the axis was also not considered.

(III. point 4, page 5, to Redfern (US 954,623))

A person having ordinary skill in the art, who has to develop an efficient machine, would not choose a spherical motor to be the basis of his development, even if he had to use a nonferrous air gap winding, as it does not have any advantages from his point of view. The person having ordinary skill in the art would not know that the effective conductor length of the coil is remarkably efficient compared to the inefficient length and that this is caused by the axis approximation on both sides. Neither the person having ordinary skill in the art nor the specialist would use the complicated, arc-shaped air gap of the machine as basis or as supplement for his efforts. **A spherical air gap motor would -to him- be the stark contrary to an efficient motor**. He does not have the basic point of view of Faraday's ideal conditions to make the machine more efficient. It would not occur to him to position the conductor part in the high speed area of the advantageous, both-sided axis approximation. He would neither know the huge advantage of an irregularly running air gap (the conductor can be penetrated by the field in the whole air gap in an ideal, right-angled way). This point of view does not matter to him as he does not see the real field, the quality and quantity of its course; instead he concentrates on the abstract, mathematical flux and its quantity, which (from his point of view) increases vastly with a small air gap and when iron is used for the winding. He would rather choose hollow-cylindrical air gap, in which the coil is positioned (drum winding).
It is also likely that the magnet in **Nozawa's (JP 58-179,153)** machine is magnetized diametrically **(Redfern US 954,623, Fig. 2)**, as it is still normal for drag-cup motors (out of ignorance concerning the loss of efficiency due to the diminished field flow). This means that the field lines do not run right-angled from the magnet surface and on the shortest way straight to the facing bordering surface, as it is deliberately stated in the definition of the invention. **(see: point 7, page 4, to claim 170, last both paragraphs, begin with Fukami)**

Figs. 25, 26 and Figs. 14, 15 and Fig. 36 show efficient constructions of such an air gap.

7. Concerning point 7.)

(See also: Amendment "A," April 17, 2003, page 20, line 7– page 22, line 15)

Concerning claim 167:

An increase of the efficiency due to a conductor elongation (folding the coil around the magnet edge) to use the stray field is not only impossible; it also leads to the contrary **(see Aoki, III. Concerning point 4.)** Aoki neither positioned a (uniform or non-uniform) air gap **(II.**

General 2) in neither the folding area nor a magnetic pole at the outer edge (of which the bordering surface is magnetized in direction of the folding area of the conductor).

A person having ordinary skill in the art would not see something new or useable in Aoki's invention, as the usage of the stray field lines is a well-known concept to him, because inner pole machines were preferred in the electro machine area, thinking the stray fields would be used more efficiently this way, which is not an argument nowadays, as the insignificance of this field is known. The person having ordinary skill in the art only notices the unnecessary conductor enlongation for the folding and the additional work for this folding.

Concerning claim 170:

The claim has been restricted further, to emphasize the innovation and the innovative steps. The machine described in claim 170 is new and only made possible by the realization that both winding heads are moved to the area near the axis (because parallel air gap sections are used and the coil is folded around the girth area of a body in the middle), whereas in common disc machines there is always one winding head area in the girth area, which causes overlapping.

One other realization necessary for the development is that without the winding heads in the girth area the way is free to minimize the extent of the coils in the air gap in the air gap direction, except for the area near the axis (**Fig. 10, 11 and Fig. 12, 13**). For this realization it is important to know that the magnetic flux has to be kept at a high level especially in high speed areas by minimizing the air gap, as this is where most energy is transformed. This is only possible because there is no overlapping in the winding heads in the outer disc area. One can even position more poles in the girth area, as the air gap length can be small here (**Fig. 3-5, 8, 9, 14**).

Additionally one needs to know that such a machine can only be constructed if the coils run v-shaped from the axis or shaft, as only then the overlapping can be reduced to an acceptable amount (**Figs. 11, 13, 15**).

One can see an overlapping which cannot be realized in **Fukami's machine (US 4,604540)**, in Fig. 4. One only need to see the seven neighboring coils and that they border at each other in one single point near the axis (which means a seven-fold overlapping) to know that the complete winding results in an extent of overlapping near the axis which cannot be

realized. This dramatic amount of overlapping was not considered in the axial cross section-drawing (**see Fig. 6**).

In **Aoki**'s invention this problem is only minimally defused, but not depicted. This overlapping problem may also be the reason why no disc machine with parallel air gaps or one-sided axis approximation of a drum winding (like **Morino**'s machine **(JP 361251460A))** is available on the market and cannot be found in any small device or computer (and direct current motors have been developed for those devices).

Even the experts of the big electronic companies like Matsushita (Morino, Oba), Pioneer (Yamashina), Seiko (Fukami), Canon (Aoki) cannot see the problem, because the overlapping problem has not been described in any of these patents. For a person having ordinary skill in the art, the above-mentioned findings and the necessary steps in development are even less obvious, as the person having ordinary skill in the art sticks to iron-filed coils and minimizing of the air gap, as it is taught at the university.

The new claim 221 (former 170) has been formulated more clearly as compared to claim 170 and has been supplemented by single conductor coils.

(see: Figs. 14, 15, claim 171, RCE, Preliminary Amendment, February 4,2004, Point 2.1.2 and 2.1.3)

Concerning claim 172:

For the reasons described in claim 170, a person having ordinary skill in the art would never have the idea to realize a machine with nonferrous winding. Should he want to develop a highly efficient machine, he would still choose a machine with a rotary current winding inserted in grooves. This has been emphasized by rejected offers concerning applicant's developments (inventions) by many manufacturers and conversations with these experts, who were, in some cases, even specialists for highly efficient machines. This means that a machine described in claim 172 is not only unusual to a person having ordinary skill in the art, but also to specialists. Only very progressive specialists have been open to the knowledge applicant researched and that is described in this present patent application. The rejection gives way to amazement and that to enthusiasm - even conservative scientist are interested more and more. Such actions are clear indications of non-obviousness of the present invention.

This knowledge may sometimes seem obvious but actually it opens totally new ways in the construction of electric machines, it marks a new beginning in this area, which may be hard to accept for a person having ordinary skill in the art.

(RCE, Preliminary Amendment, February 4, 2004, Point 2.1.1)

Concerning claim 222 (former 171), 173,174:

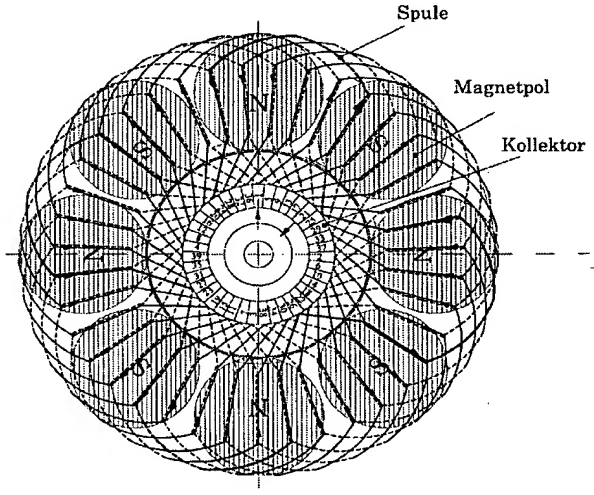
(See "concerning claim 170")

(See also: RCE, Preliminary Amendment, Feb. 4,2004, Point 2.1.3)

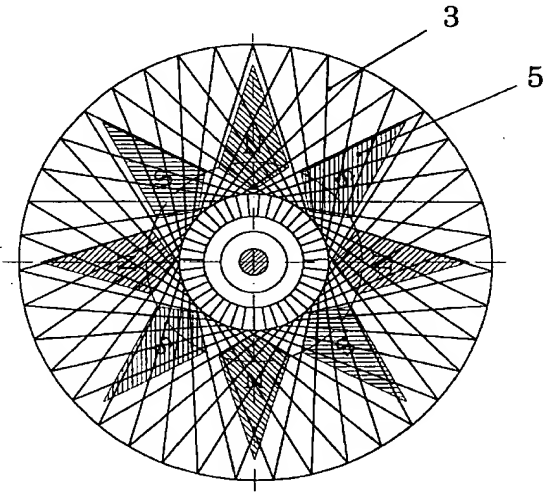
In contrast to claim 170 an additional innovative step is included in this description: the overlapping is limited to a two layer winding; the coil is not (as usual) wound in abutting relationship in the girth area like a yarn spool, but in such a distance that the conductors are positioned next to each other near the axis, so that no additional overlapping occurs. This is shown in **Figs. 14, 15**. In **Fig. 14** one can see the even coil thickness in direction of the air gap and in **Fig. 15** the position (distance) of the V-shaped single conductor coils, which complement each other to a two-layered winding.

Another step in the development is that the winding is not only designed as a two-pole winding **(Fukami (US 4,604,540))** but also as a multiple-pole winding which makes it more efficient.

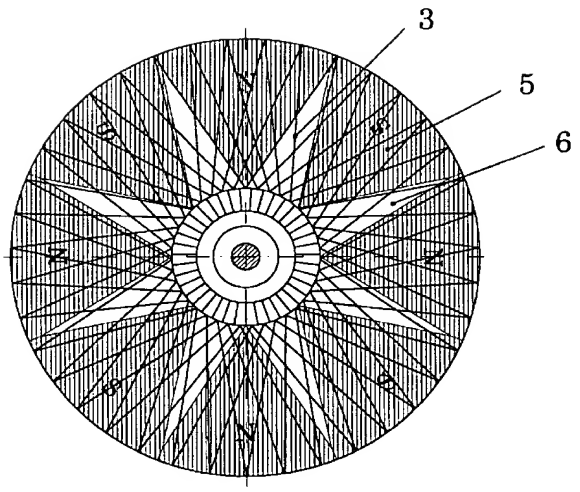
A person having ordinary skill in the art cannot imagine what effect this has on the effective pole faces. He may know the effort from the application of the winding scheme to simple disc machines, concerning the complicated, involuted conductor that you need to get effective pole faces **(picture 1)**. This is why a specialist may not expect a large effective pole face when realizing a V-shaped (which means straight and slant-wise) conductor course. This expectation can also be applied to a pancake coil **(picture 2)**.

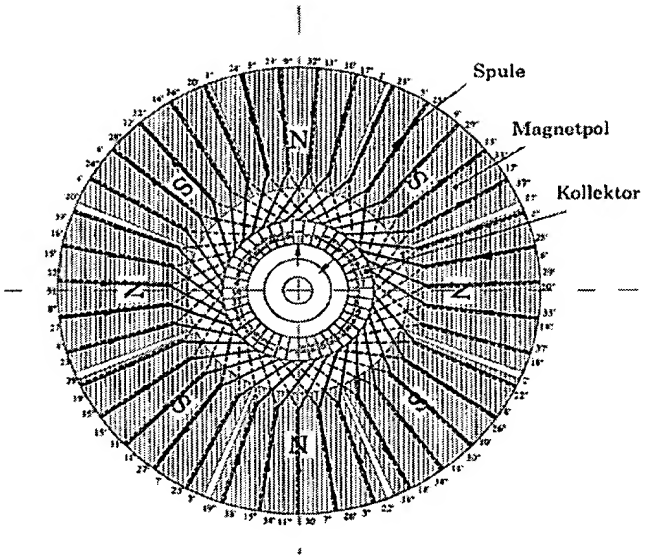


Picture 1



Picture 2





Picture 3 **Picture 4**

Picture 1 shows a common eight-pole pancake coil (complete winding)

Picture 2 shows an eight-pole pancake coil with straight conductor course with effective pole faces (complete winding)

Picture 3 shows the course of the coils in an air gap section of the invented machine according to claim 221 (former 170), 222 (former 171), which is also depicted in Figs. 14, 15, but with the pole faces not being set off. (half winding)

Picture 3 shows how astonishingly big the progress of this invention is compared to that. And you get this efficient utilization for the second air gap in the same way. The effective pole faces are modified here in an ideal way. They are much larger than in **picture 2** and cover the high-energetic girth area completely. If one looks closer he will see they also are much steeper, which makes them even more efficient. If the conductors have a radial course and are involuted or slanted near the axis (picture 4), the efficiency will increase again; the utilization of the surface is over 90%. The efficiency of the conductors is, with the winding shown in **picture 4**, approx. 68%, in contrast to that of a common pancake coil with 45% (**picture 1**). A further increase of the efficiency is easy if one uses the conductors near the axis (with more pole surfaces).

8. Concerning point 8.)

Concerning claim 169:

As described in the **RCE, Preliminary Amendment, of February, 4, 2004, page 29, Point 2.1.1**, concerning claim 169, alternating current was used only in connection with windings inserted in iron grooves up to now.

This is also the case in **Fischer**'s invention. He uses flux carrying elements 86 (preferably iron) **(Fig. 4, column 6, line 20-29)**, between which the coils are inserted. So this is not an electric machine with air gaps. Apart from that it does not have an **alternating current-winding**, but a direct current-winding (Fig. 5), which is driven by a commutator with direct current (DC). A direct current-winding can be driven by alternating current (AC). But it still is a direct current-winding, identified by its build. In addition, this AC-operation is very problematic, as the changing tension causes high eddy current losses in all of the iron parts, so that these parts have to be clad with sheet metal. Additionally the output and the number of revolutions of an AC-operation will decrease in contrast to the DC-operation.

The invented machine according to claim 169 is, in contrast to that, equipped with a nonferrous alternating current-winding. The advantage is, for one part, that the large air gap allows only little armature reaction and, for the other part, that the iron stays polarized evenly, as it follows the traveling pole of the winding (seen relatively). **The operation of such a winding is always multiphase, either due to the winding itself**, due to a preset phase-sequence **or due to additional elements like capacitor, coil or resistor**.

(See also: RCE, Preliminary Amendment, Feb. 4,2004, page 29,30, Point 2.1.1. New claim 169)

Concerning claim 185

The reference of claim 225 (185) was changed into the new claim 224 (184).

Concerning claim 186

Claim 226 (186) was supplemented by the phrase "and run next to each other" The reference of claim 226 (186) was changed into claim 224 (184).

New claim 240 (new)

The new claim 240 is directed to a hollow shaft or hollow axle within the rotating machine, through which the wire (leads of a component) for the winding or a coolant is conducted.

(specification, page 6, line 24-27, page 13, line 26-29, page 16, line 12, Figs. 24, 25)

9. **Concerning point 10:**

Concerning claims 236 (former 180), 236 (former 181), 239 (former 183)::

Claims **180 and 181** describe something which is different from the inventions described in **Nozawa, Yamashina (JP 58-063067), (Dunn)**. To emphasize this, the claims were formulated more exactly. In these claims, uniform air gaps are described (**II. General Part point 2**).

Nozawa describes a uniform, arc-shaped air gap (**see III. Concerning point 6**), but it is not obvious for a person having ordinary skill in the art to divide an air gap into sections, whose boundary surfaces border at each other and which additionally have a different form. **He would not have the idea to do that, as he does not see the advantages. He neither sees the advantage of using copper nor the advantage of having a high girth speed and no iron.**

In **Yamashita**'s invention the possible length of the uniform air gap is shortened by rounding the outer edge. Yamashita says nothing about the reason for this, as the patent application has a different focus. But it obviously has nothing to do with an increase of efficiency, as he would have shown and mentioned the rounding in his other patent application **Yamashita (JP 358063068A)**, which was filed in at the same time.

In **Fig. 2 of Yamashita (JP 358063067A)** we see an outer edge which was rounded, the conductor in the girth area running mainly outside the non-uniform air gap section. This would mean not much to a person having ordinary skill in the art for the development of a machine.

In **claims 180, 181** we see, in contrast to that, a bordering- or corner edge. **((RCE, Preliminary Amendment, from Feb. 4,2004, enclosure 1, picture 1, 2)**

To be able to use an arc-shaped air gap section this has to be invented first. From **Nozawa** we know only one motor with a circular air gap. A special intent is a prerequisite for the invention of a circular air gap section; one has to see a sense in such a form before one wants to use it, as it is complicated to build.

From **Nozawa** nothing is known of such intent. Judging from what he wants two years later in **(US 4,644,209)**, he wants to make use of the magnetic material, which means the leakage flux. This makes no sense if additional conductor length has to be invested (**III. Point 4, concerning Aoki**) which shows that **Nozawa** does not consider Faraday's ideal conditions and cannot impart this knowledge through his inventions. Instead he leads the

attention of the person having ordinary skill in the art into a totally different direction, namely the optimal use of the magnetic surface.

A few steps in development and profound independence are required to combine the section of a circular air gap with the air gap section of a different form.

Supplement to "Concerning point 14 claims 243 (former 198), 261 (former 212):

A linear use of the air gap placing of claim 212 from the other patents, supplemented by the patent of **Vallant de Guelis (US 4,924,128),** as defined by Faraday's ideal conditions, is not at all obvious to a person having ordinary skill in the art, just as with the rotating use. Would he see a sense in an air gap machine for linear use at all or if he had an application for which an air gap winding was required, the person having ordinary skill in the art would apply Rabe's design with an iron backed winding to a linear machine.

In claim 236 (former 181) not only the inner boundary surfaces of both air gap section, but also the outer boundary surfaces blend into each other, which can be seen in **Figs. 8, 9, 14**.

In claim 239 (former 183) An explanation has been added to make clear the kind of non-uniform, irregular thickness of the first body. This refers to the machine from **Fig. 14** with outer poles instead of inner poles.

10. Concerning point 11:

(see to base new claim 213 (III. Point 4))

Concerning claim 237,238 (former 182), 199:

The new claims 237, 238 are based on claim 182 and were supplemented by claim 199 and by a defined position to the axis or shaft.

Aoki only describes the use of a hollow-cylindrical air gap, through which runs a nonferrous air gap winding, using an inner magnet. For the direct current winding that is being used it can be advantageous to let the conductor run over the front side. But this is only efficient for the geometrical design (axial winding length, axial winding approximation (length from the girth up to the axis) and diminishes quickly otherwise. The increase of efficiency is dependent on the kind of winding being used and also on the slanted winding (**III. point 4, concerning Aoki**). All other kinds of windings would mean that a folding of the coil on the front side without an extra air gap (**II. General part, point 2**), which means with extra poles, would lead to a decrease of the machine's efficiency. The few stray field lines

cannot compensate for the loss. Some of the stray field lines can be used (with no noticeable effect), but only if the folding around the outer edge has a different, essential reason.

The patent by **Dunn (US 6,617,748)** is disregarded as not being proper prior art under § 102.

Rabe (US 476,2053) (see: point 5, to Rabe, Amendment "A," April 17, 2003, page 18, last paragraph – page 20, first paragraph) teaches the contact of the coil with iron and the use of an air gap as small as possible, which should be filled with conductor completely if possible, as well as a compact, bell-shaped winding, which makes it possible to push together the u-shaped wave-winding with the u-shaped magnets. The u-shape of the magnets is positioned in the direction of the axis, so that the winding heads of the coils have no axis approximation due to this position and the ineffective conductors are not shortened due to the u-shaped winding build. The winding heads, which are preferably led from the air gap 90° offset, cause more copper loss.

The teachings of Rabe make clear that a person having ordinary skill in the art does not have any interest in pushing the invention in the direction of Faraday and the realization of his ideal conditions. The u-shape of the air gap, which is not comparable with the winding due to its iron contact, makes a totally different sense here due to its position.

The u-shape of the air gap in claim **237, 238 (former 182)** has the purpose that the conductors can approximate the axis or shaft in it from both sides and that they are penetrated by the field in a right-angled, ideal way, that it has a maximal axial length in the high-speed girth area with the conductors lying (within a coil) 98° right angled to the direction of the movement. Apart from that the pole width and thus the number of poles can be chosen freely through a wide angle range, without a big loss of effective conductor length or an increase of ineffective conductor length. This makes it possible to use less pairs of poles and a less complicated build, especially in connection with regulated machines, which will soon be standard due to energy saving and better characteristics.

Morino (JP 361251460A), who teaches a one-sided axis approximation of the winding for the efficient use of a direct current winding with exterior poles, does not base his teachings on Faraday's views, either, and thus is far away from the numerous advantages due to an axis approximation from both sides.

The overlapping of the conductors near the axis was not considered for this obvious direct-current winding (**commutator 5, brushes 5, spring 7**). This is probably a paper which has been submitted for patent precautionary.

A person having ordinary skill in the art could not think of the advantages of a machine with both-sided axis approximation from any of these patents or all of these patens together. He does not have the basis for this or the farsightedness to accept that more magnetic material is needed to get a bigger air gap with the necessary strong field, to get highly efficient machines with best characteristics and low energy consumption.

11. Concerning point 12:

Concerning claim 242 (former 188)::

In **Oba**'s invention (Amendment "A," April 17,2003, page 20, line 7 – page 21, last paragraph) the same problems are addressed concerning the stray field lines as in **Aoki**'s invention (**III. point 4**). The magnets in Oba's invention are magnetized axially, which means that in the area of the outer edges stray field lines only emerge in an uncontrolled way; these are minimal and they only can have an effect if no extra conductor elongation has to be accepted for that.

It depends on the dimensioning (geometry) of the machine if a folding is worth the effort in the case of Oba's machine. This is the case if the radial conductors in the air gap are as long as possible compared with the loss conductors (in the folding area of the conductors, the conductor positioned in between and the conductor near the axis). Oba writes not without good reasons very cautiously: "there is a merit because it is possible to remarkably increase efficiency" (**Oba Translation, page 9, line 14-15**).

In Oba's invention, neither the folding area of the electronically commuted direct current motor nor the girth area (axial conductors) of the coil is equipped with an air gap and the corresponding poles and apart from that the axis-near area of the coil has been recessed.

The construction seems complicated to the average expert, the conductor length to big and the gain doubtful, especially because the axial length of the machine is also large compared to today's disc machine ((**above**, **picture 1**), which are used quite often because they are so flat.

Fischer (US 5004944) shows coils with iron cores of a direct current winding, which are arranged around an inner pole – the person having ordinary skill in the art would be interested into realizing the iron core in the winding, which is described as efficiency-increasing, so he would not think of using nonferrous air coils.

(see: III, Point 5, begin with Fischer (US 5004944) – to Rabe (US 4,763,053))

Fukami (US 4,604,540) presents a nonferrous direct current winding which runs in disc-shaped air gaps with exterior poles. This machine is not very interesting for a person having ordinary skill in the art as some coils are penetrated almost completely by the field as stated, but others are positioned completely outside the poles, which shows in the small pole face. This cannot lead to a high efficiency of the machine, especially as the winding proves to be hardly realizable because of the x-fold overlapping of the conductors near the axis.

(see: III, Point 7, to claim 170, begin with Fukami (US 4,604,540) to the end)

So from what point should the person having ordinary skill in the art realize that it is necessary to equip the folding- and girth area of a coil with poles in an optimal way? Either in connection with a continuous, uniform air gap or with a non-uniform air gap. The realization is how important an implementation of additional pole face (high number of field lines) with optimal right-angled position of the conductors to the field lines is, minimizing of the air gap length, the usage of high speed with a right-angled position of the conductor to the direction of the movement and doing without iron in contact with the winding. Even if the person having ordinary skill in the art had the idea (against all expectations) to use a continuous pole face, which is magnetized in direction of the conductor, he would dismiss the idea as he cannot foresee the gain as he does not have the basis of Faraday's views.

In the way described in **claim 188** even conductor parts (next to the folded coil parts) with coil mountings (**see Oba, figs. 4, 8**) could be used, if this mounting is not magnetic and not conductive.

The new **claim 242 (former 188)** has been formulated more clearly to emphasize the important points.

12. Concerning point 13:

Concerning claims 193, 192 (New claim 218)

The claims 193, 192 were supplemented according to Figs. 3, 4, 5, 18, 14 and 36 (curved return path flat stripe 5).

(specification, page 15, line 25 – page 16, line 2)

Aoki has a package/casing return path in the area of the folding edge, but this firstly not an outer edge (but a corner edge) and secondly there is no non-uniform air gap which has a strong, directional field with an extra pole face (**III. General Part, point 2**). Aoki has only some single stray field lines which could be absorbed by the package/casing return path. **Oba** does not have a return path flat stripe in the area of an outer edge. **Morino** has only a corner edge and no short outer edge as defined by the main claim 167.

The new claim **218** (former 167) has been expressed more clearly concerning this and is supplemented with the claims 291,188,189,192,193.

IV. Final comment

That these inventions are not obvious to a person having ordinary skill in the art has been substantiated by the difficulties Applicant had when he tried to gain acceptance with the knowledge the machines are based on, as well as with the machines as such on the market, in the scientific and technical area. **Now** meanwhile, applicant has released a book about the results of his researches on the field of the "air gap principle", the new construction concept for highly efficient machines with optimal characteristics.

More and more experts and firms are interested in this knowledge, the production and use of the machines. Small but innovative firms want to produce these machines – applicant's efforts are bearing fruit now.

In addition applicant is now invited to international specialist conferences to speak about this subject.

But applicant has come a long way since 1998. This seemingly obvious invention is (or in 1998, was) so far away from today's science and technology, and was not obvious at all.

Despite this all, the present invention is the future of electrical machines, as it is the conversion of radical discoveries concerning highly efficient machines, the state-of-the-art answer to problems concerning enviromental and economic problems.

Applicant respectfully submits that the new claims overcome the objections and rejections made by the Examiner and Applicant requests the Examiner to reconsider the rejections and to pass the application to issue.

Respectfully submitted,

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I hereby certify that this document and any being referred to as attached or enclosed is being deposited with the United States Postal Service as U.S. Mail, postage prepaid in an envelope addressed to Commissioner of Patents RCE w/NO FEE, Attn: Examiner Dawkins, P.O. Box 1450, Alexandria, VA 22313-1450, on

9-24-04 J. M. Kuselka
Date Signature

NEW CLAIMS ~~165-212~~ 213-265 from September 25, 2004

With markings

213. ~~165.~~ ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** comprising an air gap, delimited by a field device, in the form of at least two bodies at a distance from one another, with each one first body located neighboring one second body, and with magnetic poles, belonging to at least one of the facing sides of the first and second body, which are magnetized orthogonally to the air gap, extending essentially over the entire air gap transverse to a direction of movement, each as a whole or divided into partial poles, and backed with return path material, which alternate in the direction of movement, and whose field runs essentially in a straight line inside the pole surface region of each pole from one boundary surface of the air gap to the opposite boundary surface, which either also has magnetic poles or is comprised predominantly of return path material, and at least one two-pole air-core coil or a winding with two-pole air-core coils, which have no contact to return path material, extending, in section transverse to the direction of movement, into the air gap approximately in the middle and at an equal distance from the first and second bodies, moving relative to the field device and thereby each coil side of the at least one air-core coil traversing the direction of movement, and is connected at the outer edge of the air gap with another coil side directly or via predominantly inactive conductor or winding head conductor into at least one air-core coil,

wherein the air gap, in section transverse to the direction of movement, comprises at least two neighboring **uniform and/or nonuniform** air gap sections, **with every uniform air gap section having boundary surfaces (to each other) which are uniform and every nonuniform air gap section having boundary surfaces (to each other) which are nonuniform and their magnetic poles are magnetized preferably vertically to the boundary surface in direction of the coil side and** that with one of their air gap boundary surfaces belonging to the first body lie at an ~~angel~~ **angle** to one another at the joint bordering edge or corner edge arising in this way, and each coil side of the at least one air-core coil runs through the air gap with its air gap sections, with each edge changing its geometric form and thereby completing a bend or fold around the first body, and each coil side running essentially in the air gap, the individual air gap section is straight or curved, and every coil ~~side~~ stokes across both pole surface during relative moving **and straight and/or arc-shaped (curved) air gap sections are combined.**

214. ~~165,189,188~~ ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** comprising an air gap, delimited by a field device, in the form of at least two bodies at a distance from one another, with each one first body located neighboring one second body, and with magnetic poles, belonging to at least one of the facing sides of the first and second body, which are magnetized orthogonally to the air gap, extending essentially over the entire air gap transverse to a direction of movement, each as a whole or divided into partial poles, and backed with return path material, which alternate in the direction of movement, and whose field runs essentially in a straight line inside the pole surface region of each pole from one boundary surface of the air gap to the opposite boundary surface, which either also has magnetic poles or is comprised predominantly of return path material, and at least one two-pole air-core coil or a winding with two-pole air-core coils, which have no contact to return path material, extending, in section transverse to the direction of movement, into the air gap approximately in the middle and at an equal distance from the first and second bodies, moving relative to the field device and thereby each coil side of the at least one air-core coil traversing the direction of movement, and is connected at the outer edge of the air gap with another coil side directly or via predominantly inactive conductor or winding head conductor into at least one air-core coil,

wherein the air gap, in section transverse to the direction of movement, comprises at least two neighboring **uniform and/or nonuniform** air gap sections, **with every uniform air gap section having boundary surfaces (to each other) which are uniform and every nonuniform air gap section having boundary surfaces (to each other) which are nonuniform and their magnetic poles are magnetized preferably vertically to the boundary surface in direction of the coil side and** that with one of their air gap boundary surfaces belonging to the first body lie at an ~~angel~~ **angle** to one another at the joint bordering edge or corner edge arising in this way, and each coil side of the at least one air-core coil runs through the air gap with its air gap sections, with each edge changing its geometric form and thereby completing a bend or fold around the first body, and each coil side running essentially in the air gap, the individual air gap section is straight or curved, and every coil ~~side~~ stokes across both pole surface during relative moving **and straight and/or arc-shaped air gap sections are combined**

~~189 An An electrical machine according to claim 217 (169) 165 165, wherein, the air gap, in section transverse to the direction of movement, comprises~~

(specification, page 18, last paragraph - page 19, first paragraph)

and at least two neighboring air **uniform and/or nonuniform** gap sections, and the magnetic poles belong at least to different boundary surfaces of the air gap and the magnetic poles of the

one air gap section, which belong to the boundary surface of the first body, lie with their faces at a distance to the return path material of the abutting, neighboring boundary surface of the other air gap section, which comprises at least predominantly return path material, **or**

~~188.(former 141) An electrical machine according to claim **168** 168, wherein, the air gap, in section transverse to the direction of movement, comprises~~

(specification, page 18, last paragraph, page 14, line 23 - 33)

claim 188 (former 141,100,62))

at least two neighboring **uniform and/or nonuniform** air gap sections which contain, in their boundary surfaces which belong to the first body and abut one another, magnetic partial poles which, ~~out~~ over the joint edge ~~or with an outer edge~~, form a joint continuous pole which is magnetized **in direction of the coil sides** orthogonally to its air gap boundary surface **and are part of an uniform or nonuniform air gap**.

(claim 167 (former 124, 45), claim 154 (former 75)

(specification, page 9, line 23 - 29)

215. ~~203,165~~ **(CURRENTLY AMENDED)** ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** [according to claim 165, 166, 167, 168, 169, 170, 171,]

comprising an air gap, delimited by a field device, in the form of at least two bodies at a distance from one another, with each one first body located neighboring one second body, and with magnetic poles, belonging to at least one of the facing sides of the first and second body, which are magnetized orthogonally to the air gap, extending essentially over the entire air gap transverse to a direction of movement, each as a whole or divided into partial poles, and backed with return path material, which alternate in the direction of movement, and whose field runs essentially in a straight line inside the pole surface region of each pole from one boundary surface of the air gap to the opposite boundary surface, which either also has magnetic poles or is comprised predominantly of return path material, and at least one two-pole air-core coil or a winding with two-pole air-core coils, which have no contact to return path material, extending, in section transverse to the direction of movement, into the air gap approximately in the middle and at an equal distance from the first and second bodies, moving relative to the field device and thereby each coil side of the at least one air-core coil traversing the direction of movement, and is connected at the outer edge of the air gap with another coil side directly or via predominantly inactive conductor or winding head conductor into at least one air-core coil,

wherein the air gap, in section transverse to the direction of movement, comprises at least two neighboring **uniform and/or nonuniform** air gap sections, **with every uniform air gap section having boundary surfaces (to each other) which are uniform and every nonuniform air gap section having boundary surfaces (to each other) which are nonuniform and their magnetic poles are magnetized preferably vertically to the boundary surface in direction of the coil side and** that with one of their air gap boundary surfaces belonging to the first body lie at an ~~angel~~ **angle** to one another at the joint bordering edge or corner edge arising in this way, and each coil side of the at least one air-core coil runs through the air gap with its air gap sections, with each edge changing its geometric form and thereby completing a bend or fold around the first body, and each coil side running essentially in the air gap, the individual air gap section is straight or curved, and every coil ~~side~~ stokes across both pole surface during relative moving **and straight and/or arc-shaped air gap sections are combined**

~~203. An electrical machine according to claim 165, 166, 167, 168, 169, 170, 171,~~ **wherein** the field device is located, at least in the form of at least two coaxial nested drum-shaped bodies at a distance from one another, on an axle or shaft, with each one first drum-shaped body located neighboring one second drum-shaped body and these, in section transverse to the direction of movement, each delimiting one air gap section, with two straight air gap sections or at least one straight and one curved air gap section or at least one curved air gap section forming the air gap, which approaches an axle or shaft in at least one region, with each coil side of the at least one air-core coil bent within at least one curved air gap section and/or changing its shape on at least one bordering edge or corner edge, at which each two neighboring air gap sections abut at their boundary surfaces belonging to the first body, and/or on an outer edge of the first body and bending or folding around the first body and extending over the entire air gap approximately centrally between the first and second body and at approximately equal distances from them, and the magnetic poles, which delimit the air gap and each air gap section on at least one side, are preferably magnetized orthogonally to their air gap boundary surface, extend along the air gap in section transverse to the direction of movement, and alternate around the periphery, and the field device rotates relative to the at least one air-core coil **and the first and second bodies of the field device preferably securely connected and moving preferably uniformly with one another.**

(claim 156 with markings or claim 114 and 77, claim 35 from 6/13/00)

216. ~~166.~~ ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** comprising an air gap, delimited by a field device, in

the form of at least two bodies at a distance from one another, with each one first body located neighboring one second body, and with magnetic poles, belonging to at least one of the facing sides of the first and second body, which are magnetized orthogonally to the air gap, extending essentially over the entire air gap transverse to a direction of movement, each as a whole or divided into partial poles, and backed with return path material, which alternate in the direction of movement, and whose field runs essentially in a straight line inside the pole surface region of each pole from one boundary surface of the air gap to the opposite boundary surface, which either also has magnetic poles or is comprised predominantly of return path material, and at least one two-pole air-core coil or a winding with two-pole air-core coils, which have no contact to return path material, extending, in section transverse to the direction of movement, into the air gap approximately in the middle and at an equal distance from the first and second bodies, moving relative to the field device and thereby each coil side of the at least one air-core coil traversing the direction of movement, and is connected at the outer edge of the air gap with another coil side directly or via predominantly inactive conductor or winding head conductor into at least one air-core coil,

wherein the air gap, in section transverse to the direction of movement, comprises at least one curved **uniform and/or nonuniform** air gap section, **with every uniform air gap section having boundary surfaces (to each other) which are uniform and every nonuniform air gap section having boundary surfaces (to each other) which are nonuniform**, which is delimited by the inside of the first body and outside of the second body and in which at least one curved air gap section each coil side of the at least one air-core coil extends essentially along the full length of the curve, and the coil sides run through the air gap with its at least one air gap section.

217. ~~203,166~~ **(CURRENTLY AMENDED)** ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** [according to claim 165, 166, 167, 168, 169, 170, 171,]

comprising an air gap, delimited by a field device, in the form of at least two bodies at a distance from one another, with each one first body located neighboring one second body, and with magnetic poles, belonging to at least one of the facing sides of the first and second body, which are magnetized orthogonally to the air gap, extending essentially over the entire air gap transverse to a direction of movement, each as a whole or divided into partial poles, and backed with return path material, which alternate in the direction of movement, and whose field runs essentially in a straight line inside the pole surface region of each pole from one boundary surface of the air gap to the opposite boundary surface, which either also has magnetic poles or is

comprised predominantly of return path material, and at least one two-pole air-core coil or a winding with two-pole air-core coils, which have no contact to return path material, extending, in section transverse to the direction of movement, into the air gap approximately in the middle and at an equal distance from the first and second bodies, moving relative to the field device and thereby each coil side of the at least one air-core coil traversing the direction of movement, and is connected at the outer edge of the air gap with another coil side directly or via predominantly inactive conductor or winding head conductor into at least one air-core coil,
wherein the air gap, in section transverse to the direction of movement, comprises at least one curved **uniform and/or nonuniform** air gap section, **with every uniform air gap section having boundary surfaces (to each other) which are uniform and every nonuniform air gap section having boundary surfaces (to each other) which are nonuniform**, which is delimited by the inside of the first body and outside of the second body and in which at least one curved air gap section each coil side of the at least one air-core coil extends essentially along the full length of the curve, and the coil sides run through the air gap with its at least one air gap section,
~~203. An electrical machine according to claim 165, 166, 167, 168, 169, 170, 171,~~
wherein the field device is located, at least in the form of at least two coaxial nested drum-shaped bodies at a distance from one another, on an axle or shaft, with each one first drum-shaped body located neighboring one second drum-shaped body and these, in section transverse to the direction of movement, each delimiting one air gap section, with two straight air gap sections or at least one straight and one curved air gap section or at least one curved air gap section forming the air gap, which approaches an axle or shaft in at least one region, with each coil side of the at least one air-core coil bent within at least one curved air gap section and/or changing its shape on at least one bordering edge or corner edge, at which each two neighboring air gap sections abut at their boundary surfaces belonging to the first body, and/or on an outer edge of the first body and bending or folding around the first body and extending over the entire air gap approximately centrally between the first and second body and at approximately equal distances from them, and the magnetic poles, which delimit the air gap and each air gap section on at least one side, are preferably magnetized orthogonally to their air gap boundary surface, extend along the air gap in section transverse to the direction of movement, and alternate around the periphery, and the field device rotates relative to the at least one air-core coil **and the first and second bodies of the field device preferably securely connected and moving preferably uniformly with one another.**

(claim 156 with markings or claim 114 and 77, claim 35 from 6/13/00)

218. ~~167,191,189,188(141),192+193~~ ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** comprising an air gap, delimited by a field device, in the form of at least two bodies at a distance from one another, with each one first body located neighboring one second body, and with magnetic poles, belonging to at least one of the facing sides of the first and second body, which are magnetized orthogonally to the air gap, extending essentially over the entire air gap transverse to a direction of movement, each as a whole or divided into partial poles, and backed with return path material, which alternate in the direction of movement, and whose field runs essentially in a straight line inside the pole surface region of each pole from one boundary surface of the air gap to the opposite boundary surface, which either also has magnetic poles or is comprised predominantly of return path material, and at least one two-pole air-core coil or a winding with two-pole air-core coils, which have no contact to return path material, extending, in section transverse to the direction of movement, into the air gap approximately in the middle and at an equal distance from the first and second bodies, moving relative to the field device and thereby each coil side of the at least one air-core coil traversing the direction of movement, and is connected at the outer edge of the air gap with another coil side directly or via predominantly inactive conductor or winding head conductor into at least one air-core coil,

(see 167 (former 124,45)) (claim 23,20,24,25,1,12,19,33 from June 13, 2000)

wherein the air gap, in section transverse to the direction of movement, comprises at least two neighboring **uniform and/or nonuniform** air gap sections, **with every uniform air gap section having boundary surfaces (to each other) which are uniform and every nonuniform air gap section having boundary surfaces (to each other) which are nonuniform and** lying close to one another, whose inner boundary surfaces approach closely enough to each other on at least one side that they are connected by a short outer edge of the jointly delimited first body **and/or whose boundary surfaces belonging to the first body abut at the bordering edge or corner edge of the first body**, and each coil side of the at least one coil runs through the air gap with the air gap sections and thereby each coil side completes one or more bends and/or folds around the **short** outer edge **and/or the bordering edge or corner edge** of the first body, and each coil side essentially runs in the air gap and the folded region of the coil is penetrated **at least** to a large extent by the field, in that in this part of the folded region at least one uniform and/or **nonuniform** (irregular) air gap section delimits the conductor with magnetic poles affixed to at least one side, and/or the **short** outer edge forms a pole face having the same polarity with at least one boundary surface of the air gap sections pertaining to the first body**, which is occupied**

with magnetic poles which are magnetized vertically to the boundary surface in the direction of the coils sides

and/or

~~191. An electrical machine according to claim 167, wherein,~~

in section transverse to the direction of movement, at least one second body in the folded region in the region of **the bordering edge or corner edge** ~~the edge~~ **or** outer edge at least partially follows ~~the conductor or~~ a curved coil trace at a uniform distance,

(claim 144 with markings or claim 103 and 65)

and/or

~~189 An An electrical machine according to claim 217 (169) 165 165, wherein, the air gap, in section transverse to the direction of movement, comprises~~

and at least two neighboring air **uniform and/or nonuniform** gap sections, and the magnetic poles belong at least to different boundary surfaces of the air gap and the magnetic poles of the one air gap section, which belong to the boundary surface of the first body, lie with their faces at a distance to the return path material of the abutting, neighboring boundary surface of the other air gap section, which comprises at least predominantly return path material,

(claim 189 (former 142,101,63), claim 21 from Dec.12, 2000)

(specification, page 18, last paragraph - page 19, first paragraph) (claim 189(142))

and/or

~~188.(former 141) An electrical machine according to claim 168 168, wherein, the air gap, in section transverse to the direction of movement, comprises~~

at least two neighboring **uniform and/or nonuniform** air gap sections which contain, in their boundary surfaces which belong to the first body and abut one another, magnetic partial poles which, **out** over the joint edge **or with an outer edge**, form a joint continuous pole which is magnetized **in direction of the coil sides** orthogonally to its air gap boundary surface **and are part of an uniform or nonuniform air gap**,

(claim 188 (former 141,100,62), claim 20 from Dec.12, 2000)

(specification, page 9, line 23 - 29)

(specification, page 18, last paragraph, page 14, line 23 - 33)

and/or

~~192 An electrical machine according to claim 167,~~

wherein at least one second body is connected via its edges lying in the direction of movement with a return path flat band which delimits the air gap on one side in the folded region in the

region of an **bordering edge or corner** **edge and/or** **short** outer edge **and is a part of at least predominantly nonuniform air gap,**

(claim 192 (former 145,104,66), claim 24 from Dec.12, 2000)

and/or

~~193 An electrical machine according to claim 192,~~

wherein the return path flat band carries, on the side toward the air gap, magnetic poles which extend transverse to the direction of movement, alternate in the direction of movement, and are magnetized in the direction of the first body, in the direction of the **bordering edge or corner** **edge and/or** **short** outer edge **and is a part of at least predominantly nonuniform air gap.**

(claim 193 (former 146,105,67), claim 25 from Dec.12, 2000)

219. ~~168.~~ Verweis von: ~~208,209~~,198,199,178, 174+173, ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** comprising an air gap, delimited by a field device, in the form of at least two bodies at a distance from one another, with each one first body located neighboring one second body, and with magnetic poles, belonging to at least one of the facing sides of the first and second body, which are magnetized orthogonally to the air gap, extending essentially over the entire air gap transverse to a direction of movement, each as a whole or divided into partial poles, and backed with return path material, which alternate in the direction of movement, and whose field runs essentially in a straight line inside the pole surface region of each pole from one boundary surface of the air gap to the opposite boundary surface, which either also has magnetic poles or is comprised predominantly of return path material, and at least one two-pole air-core coil or a winding with two-pole air-core coils, which have no contact to return path material, extending, in section transverse to the direction of movement, into the air gap approximately in the middle and at an equal distance from the first and second bodies, moving relative to the field device and thereby each coil side of the at least one air-core coil traversing the direction of movement, and is connected at the outer edge of the air gap with another coil side directly or via predominantly inactive conductor or winding head conductor into at least one air-core coil,

wherein the air gap, in section transverse to the direction of movement, comprises at least two neighboring **uniform and/or nonuniform** air gap sections, **with every uniform air gap section having boundary surfaces (to each other) which are uniform and every nonuniform air gap section having boundary surfaces (to each other) which are nonuniform,** lying close **and parallel** to one another, whose inner boundary surfaces approach closely enough to each other on at least one side that they are connected by a short outer edge of the jointly delimited first

body, and each coil side of the at least one coil runs through the air gap with the air gap sections and thereby each coil side completes one or more bends and/or folds around the **short** outer edge of the first body , and each coil side essentially runs in the air gap and all coil side sections of coil side within the respective air gap section are movable with ~~essentially~~ the same speed relative to the field device.

220. ~~169.~~ ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** comprising an air gap, delimited by a field device, in the form of at least two bodies at a distance from one another, with each one first body located neighboring one second body, and with magnetic poles, belonging to at least one of the facing sides of the first and second body, which are magnetized orthogonally to the air gap, extending essentially over the entire air gap transverse to a direction of movement, each as a whole or divided into partial poles, and backed with return path material, which alternate in the direction of movement, and whose field runs essentially in a straight line inside the pole surface region of each pole from one boundary surface of the air gap to the opposite boundary surface, which either also has magnetic poles or is comprised predominantly of return path material, and at least one two-pole air-core coil or a winding with two-pole air-core coils, which have no contact to return path material, extending, in section transverse to the direction of movement, into the air gap approximately in the middle and at an equal distance from the first and second bodies, moving relative to the field device and thereby each coil side of the at least one air-core coil traversing the direction of movement, and is connected at the outer edge of the air gap with another coil side directly or via predominantly inactive conductor or winding head conductor into at least one air-core coil,

wherein, in section transverse to the direction of movement, comprises at least

~~with~~ two straight air gap sections or at least one straight and one curved air gap section or at least one curved air gap section forming the air gap,

and each coil side of the at least one air-core coil runs through the air gap with its **uniform and/or nonuniform** air gap sections, **with every uniform air gap section having boundary surfaces (to each other) which are uniform and every nonuniform air gap section having boundary surfaces (to each other) which are nonuniform,**

with each coil side of the at least one air-core coil bent within at least one curved air gap section and/or changing its shape on at least one edge, at which each two neighbouring air gap sections abut at their boundary surfaces belonging to the first body, and/or on an **short** outer edge of the first body and bending or folding around the first body and extending over the entire air gap

approximately centrally between the first and second body and at approximately equal distances from them, and the magnetic poles, which delimit the air gap and each air gap section on at least one side, are magnetized orthogonally to their air gap boundary surface, extend along the air gap in section transverse to the direction of movement, and alternate around the periphery, and the field device moves relative to the at least one air-core coil, with the first and second bodies of the field device securely connected and moving uniformly with one another (claim 35 from 6/13/00) and the winding consists of at least one alternating **nonferrous** current winding.

(Claim 122, 156 with markings (claim 80))
The basis of this invention is described in the Specification on page 4, lines 6-14, page 10, line 31-33, page 11, line 1-2, page 22, line 10-12, line 18-21. You can see alternating current winding in fig.2,11,25,28,30,32,37.

221. ~~170,171~~ **(NEW)** ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** comprising an air gap, delimited by a field device, in the form of at least two bodies at a distance from one another, with each one first body located neighboring one second body, and with magnetic poles, belonging to at least one of the facing sides of the first and second body, which are magnetized orthogonally to the air gap, extending essentially over the entire air gap transverse to a direction of movement, each as a whole or divided into partial poles, and backed with return path material, which alternate in the direction of movement, and whose field runs essentially in a straight line inside the pole surface region of each pole from one boundary surface of the air gap to the opposite boundary surface, which either also has magnetic poles or is comprised predominantly of return path material, and at least one two-pole air-core coil or a winding with two-pole air-core coils, which have no contact to return path material, extending, in section transverse to the direction of movement, into the air gap approximately in the middle and at an equal distance from the first and second bodies, moving relative to the field device and thereby each coil side of the at least one air-core coil traversing the direction of movement, and is connected at the outer edge of the air gap with another coil side directly or via predominantly inactive conductor or winding head conductor into at least one air-core coil,

wherein, in section transverse to the direction of movement, comprises at least
~~with~~ two straight air gap sections or at least one straight and one curved air gap section or at least one curved air gap section forming the air gap,

and each coil side of the at least one air-core coil runs through the air gap with its **uniform and/or nonuniform** air gap sections, **with every uniform air gap section having boundary surfaces (to each other) which are uniform and every nonuniform air gap section having boundary surfaces (to each other) which are nonuniform,**
with each coil side of the at least one air-core coil bent within at least one curved air gap section and/or changing its shape on at least one edge, at which each two neighbouring air gap sections abut at their boundary surfaces belonging to the first body, and/or on an **short** outer edge of the first body and bending or folding around the first body and extending over the entire air gap approximately centrally between the first and second body and at approximately equal distances from them, and the movement is a rotating one around an axis or shaft and the magnetic poles, which delimit the air gap and each air gap section on at least one side, are magnetized orthogonally to their air gap boundary surface, extend along the air gap in section transverse to the direction of movement, and alternate around the periphery, and the field device rotates relative to the at least one air-core coil, with the first and second bodies of the field device securely connected and moving uniformly with one another and the **nonferrous** winding consists of air coil overlapping each other with **one or** several winding each, which run generally V-shaped from the girth area in direction of the axis or shaft as **single conductor or** conductor bundle.
(Specification page 13, line 6-18, Fig.10,11,12,13)

222. ~~171.~~ (NEW) ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** comprising an air gap, delimited by a field device, in the form of at least two bodies at a distance from one another, with each one first body located neighboring one second body, and with magnetic poles, belonging to at least one of the facing sides of the first and second body, which are magnetized orthogonally to the air gap, extending essentially over the entire air gap transverse to a direction of movement, each as a whole or divided into partial poles, and backed with return path material, which alternate in the direction of movement, and whose field runs essentially in a straight line inside the pole surface region of each pole from one boundary surface of the air gap to the opposite boundary surface, which either also has magnetic poles or is comprised predominantly of return path material, and at least one two-pole air-core coil or a winding with two-pole air-core coils, which have no contact to return path material, extending, in section transverse to the direction of movement, into the air gap approximately in the middle and at an equal distance from the first and second bodies, moving relative to the field device and thereby each coil side of the at least one air-core

coil traversing the direction of movement, and is connected at the outer edge of the air gap with another coil side directly or via predominantly inactive conductor or winding head conductor into at least one air-core coil,

wherein, in section transverse to the direction of movement, comprises at least

~~with~~ two straight air gap sections or at least one straight and one curved air gap section or at least one curved air gap section forming the air gap,

and each coil side of the at least one air-core coil runs through the air gap with its **uniform and/or nonuniform** air gap sections, **with every uniform air gap section having boundary surfaces (to each other) which are uniform and every nonuniform air gap section having boundary surfaces (to each other) which are nonuniform,**

with each coil side of the at least one air-core coil bent within at least one curved air gap section and/or changing its shape on at least one edge, at which each two neighbouring air gap sections abut at their boundary surfaces belonging to the first body, and/or on an **short** outer edge of the first body and bending or folding around the first body and extending over the entire air gap approximately centrally between the first and second body and at approximately equal distances from them, and the movement is a rotating one around an axis or shaft, and the magnetic poles, which delimit the air gap and each air gap section on at least one side, are magnetized orthogonally to their air gap boundary surface, extend along the air gap in section transverse to the direction of movement, and alternate around the periphery, and the field device rotates relative to the at least one air-core coil, with the first and second bodies of the field device securely connected and moving uniformly with one another and the winding is a **nonferrous** direct current winding with air coils 3 which one winding each, which runs generally V-shaped from the periphery region in direction of the axis or shaft, the air coils overlapping each other and twisted relative to another in the direction of movement **complement one another to a two-layered direct current winding or a multiple of that in the whole area of axis approximation.**

(Specification page 11, line 30-35, page 12, line 6-13, page 13, line 6-11, Fig.14,15, **New Fig.44,45**)

223. ~~165,182,190.~~ **(CURRENTLY AMENDED)** ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** [according to claim 165, 166, 167, 168, 169, 170, 171,]

comprising an air gap, delimited by a field device, in the form of at least two bodies at a distance from one another, with each one first body located neighboring one second body, and with

magnetic poles, belonging to at least one of the facing sides of the first and second body, which are magnetized orthogonally to the air gap, extending essentially over the entire air gap transverse to a direction of movement, each as a whole or divided into partial poles, and backed with return path material, which alternate in the direction of movement, and whose field runs essentially in a straight line inside the pole surface region of each pole from one boundary surface of the air gap to the opposite boundary surface, which either also has magnetic poles or is comprised predominantly of return path material, and at least one two-pole air-core coil or a winding with two-pole air-core coils, which have no contact to return path material, extending, in section transverse to the direction of movement, into the air gap approximately in the middle and at an equal distance from the first and second bodies, moving relative to the field device and thereby each coil side of the at least one air-core coil traversing the direction of movement, and is connected at the outer edge of the air gap with another coil side directly or via predominantly inactive conductor or winding head conductor into at least one air-core coil,
wherein the air gap, in section transverse to the direction of movement, comprises at least two neighboring **uniform and/or nonuniform** air gap sections, **with every uniform air gap section having boundary surfaces (to each other) which are uniform and every nonuniform air gap section having boundary surfaces (to each other) which are nonuniform and their magnetic poles are magnetized preferably vertically to the boundary surface in direction of the coil side and** that with one of their air gap boundary surfaces belonging to the first body lie at an ~~angel~~ **angle** to one another at the joint bordering edge or corner edge arising in this way, and each coil side of the at least one air-core coil runs through the air gap with its air gap sections, with each edge changing its geometric form and thereby completing a bend or fold around the first body, and each coil side running essentially in the air gap, the individual air gap section is straight or curved, and every coil ~~side~~ stokes across both pole surface during relative moving **and straight and/or arc-shaped air gap sections are combined**

~~182 An electrical machine according to claim 165~~

~~wherein,~~ **and** in section transverse to the direction of movement, the air gap is assembled from three air gap sections, with two straight air gap sections lying in parallel connected through a third air gap section, which is either straight and lies at a 90° angle to each of them.

~~190 An electrical machine according to claim 182~~

~~wherein,~~ **and** in section transverse to the direction of movement, the air gap comprises at least three air gap sections, with two straight air gap sections lying in parallel connected by a straight third air gap section, and magnetic poles belong to at least one of the two parallel boundary surfaces of the parallel air gap sections of the first body and are affixed to at least one of the

sides of a slot-shaped return path body belonging to the first body and the boundary surface of the air gap section, which connects the two bordering edge or corner edges, in which one boundary surface of the air gap section abuts one of each of the air gap sections, comprises return path material and forms a flat return path of the first body, which is a return path flat band, which lies at a distance to the faces of the magnetic poles and is connected with the return path body approximately in the middle or on one bordering edge or corner edge, and an air gap boundary surface of the air gap section, to which magnetic poles belong, lies opposite to the return path flat band.

224. ~~165,184.~~ **(CURRENTLY AMENDED)** ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** [according to claim 165, 166, 167, 168, 169, 170, 171,]
comprising an air gap, delimited by a field device, in the form of at least two bodies at a distance from one another, with each one first body located neighboring one second body, and with magnetic poles, belonging to at least one of the facing sides of the first and second body, which are magnetized orthogonally to the air gap, extending essentially over the entire air gap transverse to a direction of movement, each as a whole or divided into partial poles, and backed with return path material, which alternate in the direction of movement, and whose field runs essentially in a straight line inside the pole surface region of each pole from one boundary surface of the air gap to the opposite boundary surface, which either also has magnetic poles or is comprised predominantly of return path material, and at least one two-pole air-core coil or a winding with two-pole air-core coils, which have no contact to return path material, extending, in section transverse to the direction of movement, into the air gap approximately in the middle and at an equal distance from the first and second bodies, moving relative to the field device and thereby each coil side of the at least one air-core coil traversing the direction of movement, and is connected at the outer edge of the air gap with another coil side directly or via predominantly inactive conductor or winding head conductor into at least one air-core coil,
wherein the air gap, in section transverse to the direction of movement, comprises at least two neighboring **uniform and/or nonuniform** air gap sections, **with every uniform air gap section having boundary surfaces (to each other) which are uniform and every nonuniform air gap section having boundary surfaces (to each other) which are nonuniform and their magnetic poles are magnetized preferably vertically to the boundary surface in direction of the coil side and** that with one of their air gap boundary surfaces belonging to the first body lie at an ~~angel~~ **angle** to one another at the joint bordering edge or corner edge arising in this way, and

each coil side of the at least one air-core coil runs through the air gap with its air gap sections, with each edge changing its geometric form and thereby completing a bend or fold around the first body, and each coil side running essentially in the air gap, the individual air gap section is straight or curved, and every coil ~~side~~ stokes across both pole surface during relative moving **and straight and/or arc-shaped air gap sections are combined**

~~184 An electrical machine according to claim 165~~

~~wherein,~~ **and** in section transverse to direction of movement, the air gap comprises several abutting air gap sections, each two of which abut at an bordering edge or corner edge **and/or an short outer edge,** which are straight or curved, and through which each coil side of the at least one air-core coil runs, thereby completing at least one left bend and one right bend.

(184 (former 137, 96,58), claim 16 from Dec.12, 2000)

225. ~~185~~ ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** according to claim **224** ~~168~~, wherein thereby at least three straight air gap sections lie, in section transverse to the direction of movement, parallel to one another and each coil side of the at least one coil runs through the air gap with the air gap sections.

226. ~~186~~ ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** according to claim **224** ~~168~~, wherein the air gap, in section transverse to the direction of movement, comprises three straight air gap sections, with two air gap sections lying parallel to one another **and running next to each other**, and the third air gap section assuming an angle of 90° to them and each coil side of the at least one coil runs through the air gap with the air gap sections.

227. ~~172.~~ ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** according to claim **220,221** ~~169~~, characteristic is that the **nonferrous** winding consists of several alternating current windings, which together form a rotary current winding or a traveling wave winding.

(Specification page 10, line 31-33, page 11, line 1-2, Fig.36-38, page 22, line 10-12, New Figs.42,43)

228. ~~173+174.~~ ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** according to claim **219** ~~167, 168, 169, 170, 171~~, wherein the at least two air gap sections, in section transverse to the direction of movement, lie

parallel to one another, and their inner boundary surfaces delimit a uniformly narrow first body. **and**

~~174. An electrical machine according to claim 173, wherein~~ the inner boundary surfaces of the at least two air-core coil sections comprise at least predominantly return path material.

229. ~~175.~~ ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** according to claim **216** ~~166~~, wherein the air gap, in section transverse to the direction of movement, comprises at least one curved air gap section, which is delimited by the inside of the first body and on the outside by the second body, where the at least one curved air gap section is disposed adjacent to at least one other air gap section and whose boundary surfaces pertaining to the first body either converge at least on one side such that they are connected that they abut directly on the thus formed common bordering edge or corner edge and that in the at least one curved air gap section and each coil side of the at least one air-core coil extends essentially along the full length of the curve, and the coil sides run through the air gap with its air gap sections and essentially in the air gap.

230. ~~176~~ ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** according to claim **216,213** ~~166~~, wherein, in section transverse to the direction of movement, the at least one curved air gap section is an **nonuniformely** (irregular) curve.

231. ~~177~~ ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** according to claim **230** ~~176~~, wherein, in section transverse to the direction of movement, the irregular curved air gap section is elliptical.

232. ~~178.~~ ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** according to claim ~~166~~, **213,214,215,216,217,218,220,221,222,223,224,256,257,** wherein the air-coil in the air gap, in section transverse to the direction of movement, is located **at least with the conductor approximating an axis or shaft** ~~essentially~~ within the air gap **with the air gap sections**.

233. ~~178.~~ ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** according to claim **232** ~~166~~, wherein the air-core coil is located **completely** ~~essentially~~ within the air gap **with the air gap sections**.

234. ~~179~~ ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** according to claim **214** ~~165~~, wherein the air gap, in section transverse to the direction of movement, comprises at least two neighboring air gap sections, which, in section transverse to the direction of movement, are straight and lie at an angle of 90° to one another, whereby they intersect at one of their boundary surfaces, belonging to the first body, forming an ~~angular~~ corner edge of the first body.

235. ~~180.~~ ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** according to claim **213,** ~~166~~, wherein the air gap, in section transverse to the direction of movement, comprises at least two neighboring **uniform** air gap sections which abut one another at a boundary surface which belongs to the first body, forming the bordering edge or corner edge, with one air gap section straight and one air gap section circularly curved.

236. ~~181~~ ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** according to claim **216** ~~166~~, wherein, the air gap, in section transverse to the direction of movement, comprises at least two neighboring **uniform** air gap sections at least one of which is curved, abut with one of their boundary surfaces pertaining to the first body at an angle of 180° at the point of contact, thus forming a bordering edge, where the inside boundary surface of the first body and the outside boundary surface of the second body verge directly into each other and each coil side extends in the full air gap and in the area of the bordering edge it runs completely in the air gap.

~~**237.** 182. An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** ~~according to claim **165** 122, wherein, in section transverse to the direction of movement, the air gap is assembled from three air gap sections, with two straight air gap sections lying in parallel connected through a third air gap section, which is either straight and lies at a 90° angle to each of them.~~

237. ~~182.~~ ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** according to claim **213,214** ~~122~~, wherein, in section transverse to the direction of movement, the air gap is assembled from three air gap sections, with two air gap sections connected through a third air gap section **and each air gap section is straight or curved**..

(claim 14 from Dec.7, 2000)

238. ~~182.~~ ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** according to claim **237** ~~122~~, wherein, in section transverse to the direction of movement, the two air gap sections are straight and lying in parallel connected through a third air gap section, which is either straight and lies at a 90° angle to each of them **and which is positioned parallel to an axis or shaft.**
(Fig.24 and Fig.4)

239. ~~183.~~ ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** according to claim **213** ~~165~~, wherein the air gap, in section transverse to the direction of movement, comprises at least two neighboring air gap sections, with the boundary surfaces which abut at an bordering edge or corner edge comprising predominantly return path material and belonging to a narrow first body of uneven thickness **which tapers from the area of the winding head or the connection point of the coil sides to the folding area of the coil continuously** and the magnetic poles belonging to the air gap boundary surface of the second body.
(claim 200 (former 153,112,70), claim 15 from Dec.7, 2000)

240. New A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies according to claim 213,237, wherein identified by an air gap which approximates an axis or shaft with its winding heads or connective conductors, with a sleeve shaft or sleeve axis being used, through which wire or coolant is conducted.

241. New A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies according to claim 213,237, wherein the first and the second body are not securety, but rather magnetically, connected with one another.
(specification, page 17, last paragraph – page 18, line 1-4)

242. ~~188.~~ ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** according to claim **219** ~~168~~, wherein, the air gap, in section transverse to the direction of movement, comprises at least two neighboring **uniform and/or nonuniform** air gap sections which contain, in their boundary surfaces which belong to the first body and abut one another, magnetic partial poles which, **out** over the joint edge **or with an outer edge**, form a joint continuous pole which is magnetized **in direction of the coil sides**

orthogonally to its air gap boundary surface **and are part of an uniform or nonuniform air gap,**

(claim 188 (former 141,100,62), claim 20 from Dec.12, 2000)

~~*189 An An electrical machine according to claim 217 (169) 165 165, wherein, the air gap, in section transverse to the direction of movement, comprises at least two neighboring air gap sections, and the magnetic poles belong at least to different boundary surfaces of the air gap and the magnetic poles of the one air gap section, which belong to the boundary surface of the first body, lie with their faces at a distance to the return path material of the abutting, neighboring boundary surface of the other air gap section, which comprises at least predominantly return path material.*~~

~~*191. An electrical machine according to claim 167 167, wherein, in section transverse to the direction of movement, at least one second body in the folded region in the region of the edge or outer edge at least partially follows the conductor or a curved coil trace at a uniform distance. (claim 144 with markings or claim 103 and 65)*~~

~~*192 An electrical machine according to claim 167 167, wherein at least one second body is connected via its edges lying in the direction of movement with a return path flat band which delimits the air gap on one side in the folded region in the region of an kurze edge or outer edge und Teil eines mindestens vorwiegend ungleichmäßigen Luftspaltes ist.*~~

~~*193 An electrical machine according to claim 192 192, wherein the return path flat band carries, on the side toward the air gap, magnetic poles which extend transverse to the direction of movement, alternate in the direction of movement, and are magnetized in the direction of the first body, in the direction of the kurze edge or outer edge und Teil eines mindestens vorwiegend ungleichmäßigen Luftspaltes ist.*~~

243. ~~198~~ ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** according to claim **219** ~~167~~, wherein the movement is linear.

244. ~~199~~ ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** according to claim **219** ~~167~~, wherein the movement of the field device and the at least one air-core coil is rotational relative to an axle or a shaft.

245. ~~203~~ ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** according to claim **218,220,221,222,** ~~165, 166, 167, 168, 169, 170, 171~~, wherein the field device is located, at least in the form of at least two coaxial nested drum-shaped bodies at a distance from one another, on an axle or shaft, with each one first drum-shaped body located neighboring one second drum-shaped body and these, in section transverse to the direction of movement, each delimiting one air gap section, with two straight air gap sections or at least one straight and one curved air gap section or at least one curved air gap section forming the air gap, which approaches an axle or shaft in at least one region, with each coil side of the at least one air-core coil bent within at least one curved air gap section and/or changing its shape on at least one bordering edge or corner edge, at which each two neighboring air gap sections abut at their boundary surfaces belonging to the first body, and/or on an outer edge of the first body and bending or folding around the first body and extending over the entire air gap approximately centrally between the first and second body and at approximately equal distances from them, and the magnetic poles, which delimit the air gap and each air gap section on at least one side, are preferably magnetized orthogonally to their air gap boundary surface, extend along the air gap in section transverse to the direction of movement, and alternate around the periphery, and the field device rotates relative to the at least one air-core coil **and the first and second bodies of the field device preferably securely connected and moving preferably uniformly with one another.**

(claim 156 with markings or claim 114 and 77, claim 35 from 6/13/00)

246. ~~200 An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** according to claim **245,** ~~203~~, wherein the field device, at least in the shape of at least three coaxial disk-shaped bodies lying at intervals, each as a disk or disk ring, is located on an axle or shaft with each one disk-shaped body located neighboring one second disk-shaped body, and these, in section transverse to the direction of movement, each delimiting one air gap section, whose boundary surfaces belonging to the first body abut at the bordering edge or corner edge of the first body at an acute angle, and magnetic poles belong to the second disk-shaped body on the side toward the air gap which are magnetized orthogonally to the air gap, extend in the direction of the axle, and alternate around the periphery, and at least one air-core coil, each coil side of which changes its geometric form at the bordering edge or corner edge, and which is bent or folded around the first body, with this being a very thin disk-shaped body, at least in its peripheral region, with boundary surfaces which predominantly comprise return path material, and a thin return path disk of uneven thickness, and each coil side

on both sides of the first disk-shaped body extending into the air gap sections, approximately in the middle between each two disk-shaped bodies and at equal distances from them, in the direction of the axle or shaft, and connected in its region nearest the axle with another coil side into an air-core coil, with the first and second disk-shaped bodies rotatable uniformly with one another and relative to the at least one air-core coil.

247. ~~201~~ ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** according to claim **245,** ~~203~~, wherein the field device, at least in the shape of at least three coaxial disk-shaped bodies lying at intervals, each as a disk or disk ring, is located on an axle or shaft, with each one disk-shaped body located neighboring one second disk-shaped body, and these, in section transverse to the direction of movement, each delimiting one air gap section, whose boundary surfaces belonging to the first body approach one another on at least one side closely enough that they are connected by a short outer edge and lie parallel to one another, and magnetic poles belong to the second disk-shaped body on the side toward the air gap which are magnetized orthogonally to the air gap, which extend in the direction of the axle, and which alternate around the periphery, and at least one air-core coil, each coil side of which changes its geometric form at the **short** outer edge, and which is bent or folded around the first body, with this being a very thin disk-shaped body, with this being, at least in the peripheral region, a very thin disk-shaped body with boundary surfaces predominantly comprising return path material, and being a **preferably** thin return path disk of ~~uniform~~ thickness, with each coil side extending outward from there on both sides of the first disk-shaped body in the direction of the axle or shaft, into each of the air gap sections approximately centrally between each two disk-shaped bodies at equal distances from them and connected there with another coil side into an air-core coil, with the first and second disk-shaped bodies rotatable **preferably** uniformly with one another and relative to the at least one air-core coil, ~~and a large part of the folded region of the coil is penetrated by the field, in that in this part of the folded region at least a uniform and/or irregular air gap section with magnetic poles affixed on at least one side delimits the conductor~~

248. ~~173.~~ ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** according to claim **247** ~~167, 168, 169, 170, 171~~, wherein the at least two air gap sections, in section transverse to the direction of movement, lie parallel to one another, and their inner boundary surfaces delimit a uniformly narrow first body. **and**

~~174. An electrical machine according to claim 221 173, wherein~~ the inner boundary surfaces of the at least two air-core coil sections comprise at least predominantly return path material.

249. ~~202~~ ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** according to claim **245,** ~~203~~, wherein the field device, at least in the shape of at least three coaxial disk-shaped bodies lying at intervals, each as a disk or disk ring, is located on an axle or shaft, with each one disk-shaped body located neighboring one second disk-shaped body, and these, in section transverse to the direction of movement, each delimiting one air gap section, which each run on one side of the first disk-shaped body in the direction of the shaft or axle, and magnetic poles belong to at least one of the facing sides of the first and second disk-shaped bodies which are magnetized orthogonally to the air gap boundary surface, which extend in the direction of the axle, and which alternate around the periphery, with the first body comprising a slot-shaped return path body, which, in section transverse to the direction of movement, is very narrow, and magnetic poles which it carries on one of its sides, and the field device delimits a further air gap section in the peripheral region whose boundary surface belonging to the first body abuts each of the boundary surfaces also belonging to it of the neighboring air gap sections in each bordering edge or corner edge, and at least one air-core coil, with each coil side running at least partially through the air gap in the peripheral region and changing its geometric shape at both bordering edge or corner edges of the first body and bent or folded around the first body, extending outward from there on both sides of the first disk-shaped body in the direction of the axle or shaft, into each of the air gap sections approximately centrally between each two disk-shaped bodies at equal distances from them, and connected there with another coil side into an air-core coil, with the field device rotatable relative to at least one air-core coil and the first **and second disk shaped bodies thereby moving preferably uniformly with one another.**
(see: claim 76(former 29))

250. ~~204~~ ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** according to claim **245,** ~~203~~ characteristic is that at least one first body is bent or folded around the air gap and, indepent from the second body, relatively movable to at least one air gap.

251. ~~205.~~ ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** according to claim **245,** ~~203~~, wherein the first drum-shaped body has the shape of a hollow or full circular cylinder and the second drum-shaped body has the

shape of a hollow circular cylinder, with at least one of the facing shell sides of the first and second bodies, which delimit an air gap section, containing magnetic poles which are preferably radially magnetized and alternate around the periphery, and, in section transverse to the direction of movement, at least one of the facing sides of the first and second body, on the face at least one side of the first body, which delimits an air gap section, containing magnetic poles, which are magnetized orthogonally to the air gap boundary surface and axially and which alternate around the periphery, and the corner edge is formed by the abutting boundary surfaces of the shell and face sides of the air gap section belonging to the first body, which lie orthogonal to one another, each coil side of the at least one air-core coil is bent or folded around it and it extends from there outward into the air gap section on the shell side, and in the direction of the axle or shaft in the air gap section on the face side.
(claim 156)

252. ~~206~~ ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** according to claim **245,** ~~203~~, wherein the first drum-shaped body has the shape of a hollow or full circular cylinder and the second drum-shaped body has the shape of a hollow circular cylinder, with at least one of the facing shell sides of the first and second bodies, which delimit an air gap section, containing magnetic poles which are preferably radially magnetized and alternate around the periphery, and, in section transverse to the direction of movement, at least one of the facing faces of the first and second body, which delimit an air gap section on the face on the least one side of the first body, containing magnetic poles, which are preferably magnetized orthogonally to the air gap boundary surface and which alternate around the periphery, with the air gap sections on the face, in section transverse to the direction of movement, lying abtuse angle to the air gap section on the shell side, and the boundary surfaces, belonging to the first body, of one air gap section on the shell side and one air gap section on the face, each abutting in an corner edge of the first body, around which each coil side of the at least one air-core coil is bent or folded and extends from there into the air gap section on the shell side and into the air gap sections on the face, each in the direction of the axle or shaft.
(claim 156)

253. ~~207~~ ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** according to claim **245** ~~203~~, wherein the first drum-shaped body has the shape of a hollow or full circular cylinder and the second drum-shaped body has the shape of a hollow circular cylinder, with at least one of the facing shell sides of the first and

second bodies, which delimit an air gap section, containing magnetic poles, which are preferably radially magnetized and alternate around the periphery, and the circular cylinder, in section transverse to the direction of movement, having faces bent inwards on at least one side toward the axle or shaft, with at least one of the facing faces of the first and second body, which delimits an air gap section on the face on at least one side of the first body, containing magnetic poles, which are preferably magnetized orthogonally along the bending radius and which alternate around the periphery, and at least one bordering edge or corner edge formed by the abutting boundary surfaces belonging to the first body of the air gap sections on the shell side and face, in which each coil side of the at least one air-core coil changes its geometric shape and is bent or folded around the first body during its course through the air gap and extends into the air gap section on the shell side and into at least one air gap section on the face in the direction of the axle or shaft.

(claim 156)

254. ~~208~~ ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** according to claim **245** ~~203~~, wherein the field device is in the form of at least three cylindrical bodies and the cylindrical body nearest the axle is a full or hollow cylinder and all further bodies are hollow cylinders and are nested in each other at a uniform interval at least on the shell side, with, in axial section, the boundary surfaces of one first body and one second body at a time delimiting one air gap section at a time, which each extend axially on the inner and outer shell surfaces of the first hollow cylinder, and at least one of the facing shell surfaces of the first and second cylindrical bodies has magnetic poles, which are preferably radially magnetized, extend axially, and alternate around the periphery, and preferably at least one of the facing faces of the first and second cylindrical bodies, which delimit an air gap section or a folded region on at least one side of the first body, also has magnetic poles, which are, extend in the direction of the axle or shaft, and alternate around the periphery, and each coil side of the at least one air-core coil is bent or folded around an **short** outer edge of the, in section transverse to the direction of movement, **preferably** relatively ~~uniformly~~ narrow cross-section of the hollow cylindrical first body and extends from there outward on both sides of the **short** outer edge of a, in the section transverse to the direction of movement, narrow cross-section of the hollow cylindrical first body, into an air gap section on the face or on one side at a time into an air gap section on the face in the direction of the axle or shaft, and on the other side into an air gap section on the shell side.

(claim 160 with markings or claim 118 and 81, claim 39 from 6/13/00)

255. ~~173+174.~~ ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** according to claim **254** ~~167, 168, 169, 170, 171~~, wherein the at least two air gap sections, in section transverse to the direction of movement, lie parallel to one another, and their inner boundary surfaces delimit a uniformly narrow first body. **and**

~~174. An electrical machine according to claim 173, wherein~~ the inner boundary surfaces of the at least two air-core coil sections comprise at least predominantly return path material.

256. ~~165+209.~~ **(CURRENTLY AMENDED)** ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** [according to claim 165, 166, 167, 168, 169, 170, 171,]
comprising an air gap, delimited by a field device, in the form of at least two bodies at a distance from one another, with each one first body located neighboring one second body, and with magnetic poles, belonging to at least one of the facing sides of the first and second body, which are magnetized orthogonally to the air gap, extending essentially over the entire air gap transverse to a direction of movement, each as a whole or divided into partial poles, and backed with return path material, which alternate in the direction of movement, and whose field runs essentially in a straight line inside the pole surface region of each pole from one boundary surface of the air gap to the opposite boundary surface, which either also has magnetic poles or is comprised predominantly of return path material, and at least one two-pole air-core coil or a winding with two-pole air-core coils, which have no contact to return path material, extending, in section transverse to the direction of movement, into the air gap approximately in the middle and at an equal distance from the first and second bodies, moving relative to the field device and thereby each coil side of the at least one air-core coil traversing the direction of movement, and is connected at the outer edge of the air gap with another coil side directly or via predominantly inactive conductor or winding head conductor into at least one air-core coil,
wherein the air gap, in section transverse to the direction of movement, comprises at least two neighboring **uniform and/or nonuniform** air gap sections, **with every uniform air gap section having boundary surfaces (to each other) which are uniform and every nonuniform air gap section having boundary surfaces (to each other) which are nonuniform and their magnetic poles are magnetized preferably vertically to the boundary surface in direction of the coil side and** that with one of their air gap boundary surfaces belonging to the first body lie at an ~~angel~~ **angle** to one another at the joint bordering edge or corner edge arising in this way, and each coil side of the at least one air-core coil runs through the air gap with its air gap sections, with each edge changing its geometric form and thereby completing a bend or fold around the

first body, and each coil side running essentially in the air gap, the individual air gap section is straight or curved, and every coil ~~side~~ stokes across both pole surface during relative moving **and straight and/or arc-shaped air gap sections are combined**

~~*209. An electrical machine according to claim 165, 166, 167, 168, 169, 170, 171,*~~

wherein the field device comprises at least in the form of at least two long bodies, with each one first long body located neighboring one second long body, in section transverse to the direction of movement, and these each delimiting one air gap section, with **at least** two straight air gap sections or at least one straight and one curved air gap section or at least one curved air gap section forming the air gap, with each coil side of the at least one air-core coil bent in its course through the air gap around at least one first body within at least one curved air gap section and/or changing its geometric shape at least one bordering edge or corner edge and/or outer edge of the long first body in which each two neighboring air gap sections abut at their boundary surfaces, and bent or folded around the first body, and extending over the complete air gap approximately centrally between the first and second body and at approximately the same distance from each of them, and the magnetic poles, which delimit the air gap and each air gap section on at least one side, are preferably magnetized orthogonally to their air gap boundary surface, extend, in section transverse to the direction of movement, along the air gap, and alternate around the periphery, and the field device moves linearly relative to at least one air-core coil.

(claim 40 from June 13, 2000)

257. ~~166.+209~~ **(CURRENTLY AMENDED)** ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** [according to claim 165, 166, 167, 168, 169, 170, 171,]

comprising an air gap, delimited by a field device, in the form of at least two bodies at a distance from one another, with each one first body located neighboring one second body, and with magnetic poles, belonging to at least one of the facing sides of the first and second body, which are magnetized orthogonally to the air gap, extending essentially over the entire air gap transverse to a direction of movement, each as a whole or divided into partial poles, and backed with return path material, which alternate in the direction of movement, and whose field runs essentially in a straight line inside the pole surface region of each pole from one boundary surface of the air gap to the opposite boundary surface, which either also has magnetic poles or is comprised predominantly of return path material, and at least one two-pole air-core coil or a winding with two-pole air-core coils, which have no contact to return path material, extending, in section transverse to the direction of movement, into the air gap approximately in the middle and at an equal distance from the first and second bodies, moving relative to the field device and

thereby each coil side of the at least one air-core coil traversing the direction of movement, and is connected at the outer edge of the air gap with another coil side directly or via predominantly inactive conductor or winding head conductor into at least one air-core coil,
wherein the air gap, in section transverse to the direction of movement, comprises at least one curved **uniform and/or nonuniform** air gap section, **with every uniform air gap section having boundary surfaces (to each other) which are uniform and every nonuniform air gap section having boundary surfaces (to each other) which are nonuniform**, which is delimited by the inside of the first body and outside of the second body and in which at least one curved air gap section each coil side of the at least one air-core coil extends essentially along the full length of the curve, and the coil sides run through the air gap with its at least one air gap section,
~~209. An electrical machine according to claim 165, 166, 167, 168, 169, 170, 171,~~
wherein the field device comprises at least in the form of at least two long bodies, with each one first long body located neighboring one second long body, in section transverse to the direction of movement, and these each delimiting one air gap section, with **at least** two straight air gap sections or at least one straight and one curved air gap section or at least one curved air gap section forming the air gap, with each coil side of the at least one air-core coil bent in its course through the air gap around at least one first body within at least one curved air gap section and/or changing its geometric shape at least one bordering edge or corner edge and/or outer edge of the long first body in which each two neighboring air gap sections abut at their boundary surfaces, and bent or folded around the first body, and extending over the complete air gap approximately centrally between the first and second body and at approximately the same distance from each of them, and the magnetic poles, which delimit the air gap and each air gap section on at least one side, are preferably magnetized orthogonally to their air gap boundary surface, extend, in section transverse to the direction of movement, along the air gap, and alternate around the periphery, and the field device moves linearly relative to at least one air-core coil.
(claim 40 from June 13, 2000)

258. ~~209~~ ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** according to claim **213,218,220,** ~~165, 166, 167, 168, 169, 170, 171,~~
wherein the field device comprises at least in the form of at least two long bodies, with each one first long body located neighboring one second long body, in section transverse to the direction of movement, and these each delimiting one air gap section, with **at least** two straight air gap sections or at least one straight and one curved air gap section or at least one curved air gap

section forming the air gap, with each coil side of the at least one air-core coil bent in its course through the air gap around at least one first body within at least one curved air gap section and/or changing its geometric shape at least one bordering edge or corner edge and/or outer edge of the long first body in which each two neighboring air gap sections abut at their boundary surfaces, and bent or folded around the first body, and extending over the complete air gap approximately centrally between the first and second body and at approximately the same distance from each of them, and the magnetic poles, which delimit the air gap and each air gap section on at least one side, are preferably magnetized orthogonally to their air gap boundary surface, extend, in section transverse to the direction of movement, along the air gap, and alternate around the periphery, and the field device moves linearly relative to at least one air-core coil.

259. ~~210~~ ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** according to claim **258** ~~209~~, wherein the long bodies are at least three long, plate-shaped bodies of a small, uniform thickness, which lie at uniform intervals from one another, with an air gap section located between each first plate-shaped body and second plate-shaped body, and the air gap sections lying parallel to one another in section transverse to the direction of movement, with the plate-shaped bodies being long relative to their width and the long sides lying in the direction of movement and magnetic poles belonging to at least one of the facing sides of the first and second plate-shaped bodies which extend transverse to the direction of movement and are magnetized orthogonally to the surface of the plate-shaped body delimiting the air gap, and the boundary surfaces belonging to the first body, which has, in section transverse to the direction of movement, a uniformly narrow surface, two neighboring air gap sections abut one another on one long side at the outer edge, around which each of the coil sides of the at least one air-core coil is bent or folded, and extends from this folded region into the air gap section, and is connected, in the region of the other opposite long edge of the first plate-shaped body, with another coil side into an air-core coil, and the at least one air-core coil moves linearly relative to the field layout.

(Claim 163 with markings or claim 120 and 83, claim 41 from 6/13/00)

260. ~~211~~ ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** according to claim **258** ~~210~~, wherein the first and second long bodies are connected with one another in the direction of movement at their beginning and their end by a body.

261. ~~212~~ ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** according to claim **258** ~~209~~, wherein the field device comprises at least in the form of at least two long bodies, with each one first long body located neighboring one second long body, in section transverse to the direction of movement, and these each delimiting one air gap section, with at least two straight air gap sections or at least one straight and one curved air gap section or at least one curved air gap section forming the air gap, with each coil side of the at least one air-core coil bent in its course through the air gap around at least one first body within at least one curved air gap section and/or changing its geometric shape at at least one bordering edge or corner edge **and/or outer edge** of the long first body in which each two neighboring air gap sections abut at their boundary surfaces, and bent or folded around the first body, and extending over the complete air gap approximately centrally between the first and second body and at approximately the same distance from each of them, and the magnetic poles, which delimit the air gap and each air gap section on at least one side, are preferably magnetized orthogonally to their air gap boundary surface, extend, in section transverse to the direction of movement, along the air gap, and alternate around the periphery, and the field device moves linearly relative to at least one air-core coil~~.~~ **and at least one air-core coil is bent or folded around a first body which, in section transverse to the direction of movement, is essentially a circle, a triangle, a rectangle, or a square, with each coil side bent around the first body or around one or more edges of the first body, forming each corner of the polygonal cross-section of the first body, and hereby running at least through one bent or two neighboring straight air gap sections.**
(specification, page 22, line 5-14)

262. ~~194~~ ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** according to claim **213,256,** ~~169~~, wherein it is composed of several machines which use a joint second body of the field device, which is implemented as a permanent magnet body.

263. ~~195~~ ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** according to claim **213,218,219,223,224,237,256,** ~~166~~, wherein, in section transverse to the direction of movement, first and second bodies are securely connected directly or via a body, which is a return path, at the outer edges of the opposing boundary surfaces of the air gap, with the second body having at least one continuous slot in the direction of movement, for leading through an coil support, which divides the air gap boundary

surface of the second body approximately in the middle in the direction of extension of the air gap and/or is located in a folded region of the at least one air-core coil.

264. ~~196~~ ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** according to claim **213,218,223,224,256,257,** ~~166~~, wherein, in section transverse to the direction of movement, first and second bodies are securely connected directly or via a body, at the outer edges of the opposing boundary surfaces of the air gap, with the second body delimiting the air gap opposite to the first body and the coil support connected at the other outer edge of the air gap with a winding head or an inactive conductor region of the at least one air-core coil and led out of the air gap region.

265. ~~197~~ ~~An electrical machine~~ **A machine of magnetic induction with a Bent Air Core Coil Between Two Magnetic Bodies** according to claim **213** ~~167~~, wherein the field device is surrounded by a housing or is itself the housing or part of the housing, and either the at least one air-core coil is securely connected with a shaft or axle, with the field device journaled directly and/or via a housing, or the at least one air-core coil is journaled directly and/or via a coil support and/or via a housing on the shaft or axle , and the field device is thereby securely connected with the shaft or axle.